

Career & Technical Education

Program of Studies

Implementation Manual

**Revised
December 2001**

Course Models



Kentucky Department of Education
Career & Technical Education

INFORMATION TECHNOLOGY

Course Title	Recommended Grade Level				Recommended Credit
	9	10	11	12	
*Computer and Technology Applications	x				1
*Computer Support Essentials		x			1
*Help Desk				x	1
*Multimedia Publishing		x			1
*Web Page Design			x		1
Career Major Title					
Computer Maintenance & Support Services**		x	x	x	1-8
Networking**		x	x	x	1-8
Programming**		x	x	x	1-8
Web Design**		x	x	x	1-8

*These classes were developed by the Division of Career & Technical Education. They may be used to fulfill “Career Major” requirements in one or more of the 4 approved “Career Majors” in Information Technology. They are “non-vendor” or “vendor neutral” classes.

** The specific classes that may be utilized in planning a “course of study” in these 4 “Career Majors” may be found in the attached “Career Cluster/Career Major” course sequence documents. Many of these classes are either *CompTIA* generated or “Vendor” produced classes. Specific course content/curriculum should be obtained from these sources.

INFORMATION TECHNOLOGY OVERVIEW

Information Technology (IT) is the study, design, development, implementation, support or management of computer-based information systems, particularly software applications and computer hardware.

The “Computer Revolution” has affected all sectors of business. Almost all employers, from the largest manufacturer to the smallest retail store, need IT workers to keep their business operating smoothly. This demand translates into a real shortage of IT workers. According to the Information Technology Association of America, there is a projected gap of more than 800,000 unfilled IT positions this year. This fact makes IT the fastest growing employment opportunity in the nation.

In order to address this shortage of trained workers, the Kentucky Department of Education’s Division of Career and Technical Education has added “Information Technology” as a new Career Cluster area.

The Information Technology Career Cluster prepares individuals to apply technical knowledge and skills in the rapidly growing occupational fields of computer networking, programming, digital media, support services and e-commerce/web design. The Information Technology Career Cluster area will have four (4) Career Majors. They are: 1.) Networking; 2.) Computer Maintenance and Support Services; 3.) Web Design; 4.) Programming*. (This will be taking the place of the program called “Computer Systems” that is now identified in the Vocational Education Program of Studies.)

Each local school district offering classes in “Computers”, “Computer Science”, etc. is encouraged to submit a Career & Technical Education “course offerings form” to the Division of Career & Technical Education, in order to become a part of the IT network of Kentucky schools. The purpose of this effort is to consolidate the many varied computer courses, classes, programs, and etc. under one Career & Technical Education program area. This will enable schools to provide better services to students through an organized, coherent network supported by the Division of Career & Technical Education.

All schools involved in the IT program are recommended to offer a “foundations” course (preferably at the 9th grade level) titled “Computer and Technology Applications”. Students of Information Technology, regardless of which Career Major they choose to pursue, would take this course as a “first course”. A class in “Computer Support Essentials” or in “A +” is recommended for the 10th grade level for all career majors (except possibly web design).

Students following career major sequences of study in the areas of Networking and Computer Maintenance and Support Services may have the opportunity to earn industry recognized certifications (such as Network +, A +, I-Net +, Server +) as they study for their major area. Also many of these certifications may provide articulation opportunities for students who enter Kentucky Community and Technical Colleges, following high school graduation.

Students are encouraged to participate in cooperative education and other work-based learning experiences. Cooperative Education consists of in-school instruction combined with on-the-job work experience. Specific guidelines are outlined in 705 KAR 4:041. Information on other types of work-based learning are described in detail in the document Work-Based Learning Guide 2000, which is available on the KDE web page at www.kde.state.ky.us/careerandtechnicaleducation/resourcesandpublications.

The Program of Study for each career major in Information Technology is outlined in the attached “Career Major – Course Sequence” charts.

For specific information on curriculum, a course description with content/process information is attached for the following five courses: Computer and Technology Applications, Computer Support Essentials, Web Page Design, Multimedia Publishing and Help Desk I.

A career major description with content/process information is attached for each of the four “career majors” in Information Technology.

Course descriptions/curriculum for courses such as A+, Nortel, CISCO, Novell, Microsoft, etc. should be secured from the company/vendor.

Certification issues related to teaching in the Information Technology cluster area are still pending. Currently, any secondary certified teacher may request a “waiver” from the Division of Career & Technical Education in order to teach IT related classes.

Each school offering a program in Information Technology is encouraged to offer an appropriate student organization, such as the Student Technology Leadership Program (STLP). Also, “Career & Technical Student Organizations” such as Skills USA/VICA, FBLA, DECA or TSA may be utilized according to the specific organization’s constitution and by-laws.

INFORMATION TECHNOLOGY CAREER CLUSTER

CAREER MAJORS

Web Design	Networking	Computer Maintenance and Support Services	Programming
Recommended Courses	Recommended Courses	Recommended Courses	Recommended Courses
Computer & Technology Applications Multi-Media Publishing CompTIA: I-Network + CIW Apple iServices: Web Objects Web Design Related Programming Course: Visual Basic, JAVA, PERL, or C++ Apple iServices: Cocoa	Computer & Technology Applications Comp TIA: A+ Computer Support Essentials Comp TIA: I-Network +, or equivalent courses in one of the following: Nortel I and II Cisco I and II Novell: Network+ and Netware 5 Administration Microsoft: MCP Apple iServices: ACTC Comp TIA: Server +, or equivalent courses in one of the following: Nortel III and IV Cisco III and IV Novell: Netware Advanced Administration and NDS Design and Implementation Microsoft: MCSE Apple iServices: ACSA	Computer & Technology Applications Comp TIA: A+ Computer Support Essentials Comp TIA: I-Network +, Server+ or equivalent courses in one of the following: Nortel I and II Cisco I and II Novell: Network+ and Netware 5 Administration Microsoft: MCP Apple iServices: ACTC Help Desk	Computer & Technology Applications Comp TIA: A+ Visual Basic Java C++ Visual Basic (Microsoft Cert) JAVA (Advanced Placement) C++ (Advanced Placement)
Electives	Electives	Electives	Electives
Business Communication Advertising Services Adv. Computer Applications International Business Yearbook Business Technology Entrepreneurship Graphic Arts E-Commerce/Marketing	Business Principles and Application Help Desk	Advanced Computer Applications	

Types of Certifications

Vendor – Specific Certifications

1. Microsoft Certified Professional (MCP) – This first step in Microsoft certifications is achieved when a student passes one of the MCSE exams.
2. Microsoft Certified Systems Engineer (MCSE) – A program that certifies expertise of IT Professionals who work with Microsoft desktop, server, and networking components.
3. Certified Novell Expert (CNE) – This certification teaches a wide variety of network support skills for those using Novell NetWare and GroupWise to design, analyze, configure, and integrate networks.
4. Cisco Certified Network Associate (CCNA) – This certification gives network professionals the knowledge to install, configure, and operate LAN, WAN, and dial access services for small networks.
5. Apple Certified Technical Coordinator (ACTC) – This certification verifies a foundation in Mac OS X and Mac OS X Server features and use, and an ability to configure key services, perform basic trouble- shooting, and assist end users with essential Mac OS X and Mac OS X Server capabilities.
6. Apple Certified System Administrator (ACSA) – This certification is designed for full-time, professional system administrators managing medium-size to large networks of Mac systems in demanding and relatively complex multiplatform deployments. System administrators have broad professional experience, often including traditional UNIX system administration. The ACSA certification focuses on basic and advanced setup, architecture, design, configuration, integration, customization, and debugging.
7. Certified Help Desk Analyst (HDA) – Help Desk Institute Certification is the first open, standards-based, internationally recognized certification program for help desk professionals. The HDA is targeted to entry-level help desk professionals with little or no job experience.

Vendor – Neutral Certifications

1. A+ - Sponsored by the Computing Technology Industry Association (CompTIA). A+ Certification ensures the competency of Service Technicians in the computer industry. CompTIA's A+ Certification covers a broad range of PC hardware, networking, and software and is considered the proper starting place for those entering the IT industry.
2. Server + - CompTIA's Server + certification deals with advanced PC hardware

issues, such as RAID, SCSI, multiple CPUs, SANs – and more.

3. i-Net + - CompTIA's latest certification that is designed to test professionals involved in implementing and maintaining internet, intranet, and extranet infrastructure and services, as well as those developing related applications.
4. Network + - CompTIA's Network + certification provides a solid foundation in advanced networking skills for PC-based network software and hardware.
5. Certified Internet Webmaster (CIW) – CIW trains people on internet fundamentals as well as areas of Site Design, E-Commerce, Web Administration, and Web Development.

MODEL COURSE SEQUENCE

INFORMATION TECHNOLOGY CAREER CLUSTER CAREER MAJOR: WEB DESIGN			
ACADEMIC CORE			
9 TH	10 TH	11 TH	12 TH
English I	English II	English III	English IV
Physical Education ½ and Health ½	Arts and Humanities	Elective	Elective
Social Studies I	Social Studies II	Social Studies III	Elective
Science I	Science II	Science III	Physics or Principles of Technology
Algebra I	Geometry	Third Mathematics Elective (required)	Algebra II
TECHNICAL CORE			
Computer and Technology Applications	Multi-Media Publishing	*CompTIA: I-Network+ *CIW *Apple iServices: Web Objectives *Web Design	*Related Programming Course: Visual Basic, JAVA, PERL, or C++ *Apple iServices: Cocoa
	Electives: Business Communication Advertising Services Adv. Computer Applications	Electives: International Business Yearbook Business Technology	Electives: Entrepreneurship Graphic Arts E-Commerce/Marketing

***RECOMMENDED COURSES - You may obtain specific content from related vendors.**

RELATED CERTIFICATIONS: CIW, CompTIA, I-Network+

MODEL COURSE SEQUENCE

INFORMATION TECHNOLOGY CAREER CLUSTER CAREER MAJOR: NETWORKING			
ACADEMIC CORE			
9 TH	10 TH	11 TH	12 TH
English I	English II	English III	English IV
Physical Education ½ and Health ½	Arts and Humanities	Elective	Elective
Social Studies I	Social Studies II	Social Studies III	Elective
Science I	Science II	Science III	Physics or Principles of Technology
Algebra I	Geometry	Third Mathematics Elective (required)	Algebra II
TECHNICAL CORE			
Computer and Technology Applications	*CompTIA: A+ Computer Support Essentials	*CompTIA: I-Network+, or equivalent courses in one of the following: *Nortel I and II *Cisco I and II *Novell: Network+ and Network 5 Administration *Microsoft: MCP *Apple iServices: ACTC	*CompTIA: Server+, or equivalent courses in one of the following: *Nortel III and IV *Cisco III and IV *Novell: Netware Advanced Administration and NDS Design and Implementation *Microsoft: MCSE *Apple iServices: ACSA
		Elective: Business Principles and Application	Elective: Help Desk

***RECOMMENDED COURSES - You may obtain specific content from related vendors.**

**RELATED CERTIFICATIONS: CNE, MCSE, CCNA, MCP, ACTC, ACSA,
CompTIA: A+, NETWORK+, Server+**

MODEL COURSE SEQUENCE

INFORMATION TECHNOLOGY CAREER CLUSTER CAREER MAJOR: COMPUTER MAINTENANCE AND SUPPORT SERVICES			
ACADEMIC CORE			
9TH	10TH	11TH	12TH
English I	English II	English III	English IV
Physical Education ½ and Health ½	Arts and Humanities	Elective	Elective
Social Studies I	Social Studies II	Social Studies III	Elective
Science I	Science II	Science III	Physics or Principles of Technology
Algebra I	Geometry	Third Mathematics Elective (required)	Algebra II
TECHNICAL CORE			
Computer and Technology Applications	*CompTIA: A+ Computer Support Essentials	*CompTIA: I-Network+, or equivalent courses in one of the following: *Nortel I and II *Cisco I and II *Novell: Network+ and Netware 5 Administration *Microsoft: MCP *Apple iServices: ACTC	*Help Desk
		Elective: Advanced Computer Applications	

***RECOMMENDED COURSES - You may obtain specific content from related vendors.**

RELATED CERTIFICATIONS: Help Desk, MCP, ACTC, CompTIA: Server+, Network+, A+

MODEL COURSE SEQUENCE

INFORMATION TECHNOLOGY CAREER CLUSTER CAREER MAJOR: PROGRAMMING			
ACADEMIC CORE			
9 TH	10 TH	11 TH	12 TH
English I	English II	English III	English IV
Physical Education ½ and Health ½	Arts and Humanities	Elective	Elective
Social Studies I	Social Studies II	Social Studies III	Elective
Science I	Science II	Science III	Physics or Principles of Technology
Algebra I	Geometry	Third Mathematics Elective (required)	Algebra II
TECHNICAL CORE			
Computer and Technology Applications	*CompTIA: A+	*Visual Basic *JAVA *C++	*Visual Basic (Microsoft Cert) *JAVA (Advanced Placement) *C++ (Advanced Placement)

***RECOMMENDED COURSES - You may obtain specific content from related vendors.**

RELATED CERTIFICATIONS: MCP, CompTIA: A+

Computer & Technology Applications

Course Description: Students use a computer and application software including word processing, presentation, database, spreadsheets, Internet, and email to prepare elementary documents and reports. The impact of computers on society and ethical issues are presented.

Prerequisites: Basic keyboarding skills or Keyboarding Applications.

Recommended : 1 Credit

Academic Expectations	Content/Process
	<p>Students will</p> <ul style="list-style-type: none"> • Use a word processing program to create, save, print, modify, spell-check, and grammar-check a simple document. • Use a word processing program to enhance the appearance of a simple document by using centered, right justification, boldfaced, underlined, and italicized text. • Use a word processing program to change the default margins and line spacing. • Use a word processing program to create a document with headers, footers, and footnotes. • Use a presentation program with text body, graphics, and animation. • Use an electronic spreadsheet to create, save, print, modify, & obtain graphs from a simple spreadsheet. • Use an electronic spreadsheet to perform basic mathematical operations including, but not limited to, addition, subtraction, multiplication, & division. • Use an electronic spreadsheet to calculate averages and percents. • Use an electronic spreadsheet program to enhance the appearance of a spreadsheet by changing fonts, foreground and background colors; and centering text across columns. • Use a database management program to create, maintain, and print reports from a simple relational database. • Use a database management program to customize the user interface by creating and maintaining forms and reports. • Use a database management program to query tables using basic query operations such as “and”, “or”, “not”, etc. • Print in landscape and portrait orientations. • Use the component of the operating system that helps the user manipulate files and folders to copy, move, rename, and delete files; and to create, copy, move, rename, and delete folders. • Use a World Wide Web browser to navigate hypertext documents and to download files. • Use Internet search engines and understand their advantages and disadvantages. • Use an electronic mail program to send and receive electronic mail. • Discriminate between ethical and unethical uses of computers and information. • Demonstrate a basic understanding of issues regarding software copyright, software licensing, and software copying. • Demonstrate an awareness of computer viruses and a basic understanding of ways to protect a computer from viruses.

1.16, 2.18, 2.37 1.16, 6.3	<ul style="list-style-type: none"> • Demonstrate a basic understanding of the impact of computers on society. • Use and understand basic computer terminology.
<p style="text-align: center;">Connections</p> <ul style="list-style-type: none"> • STLP and related Career & Technical Student Organizations • Secretary's Commission of Achieving Necessary Skills (SCANS) • National Standards • Nationally Recognized Industry Standards and Certifications, such as A+, Net+, i-net+, Server+, etc. 	

Computer Support Essentials

Course Description: Students will learn skills necessary to perform general computer hardware and software support.

Prerequisites: Computer & Technology Applications

Recommended: 1 credit

Academic Expectations	Content/Process
<p>1.2,1.3,2.37 2.37 2.37 1.2,1.3,2.37 1.2,1.2,2.3,2.37 1.2,1.3,2.3,2.37 1.2,1.3,2.3,2.37 2.37 2.37 2.30 2.37 5.2,5.4 1.2,1.3,2.3,3.7 1.12,2.37 2.37 1.1,2.36,2.37,6.3 1.11,1.16,2.38 2.1,2.37,3.7,5.1-5.5-6.2,6.3</p>	<p>Students will</p> <ul style="list-style-type: none"> • Set up a computer out of box. • Load multiple operating systems. • Configure a computer to access a Local Area Network. • Install software from network or CD. • Install and configure new hardware and upgrades. • Install network printers. • Upgrade device drivers. • Check cable connections. • Perform basic computer & printer maintenance (clean ball & keyboard, blow out dust, clean print heads & platen bar, oil chassis). • Gain an overview of printing techniques and devices (dot matrix, ink jet, laser) and how each works. • Set up an email profile and send an email with an attachment. • Learn basic HTML and ftp web pages to a web server. • Set up scan converter and/or other projection devices. • Develop interpersonal skills. • Demonstrate appropriate telephone etiquette skills. • Research and analyze career opportunities in the computer industry. • Publish an electronic portfolio. • Diagnose and repair technological problems.
<p style="text-align: center;">Connections</p> <ul style="list-style-type: none"> • STLP and related Career & Technical Student Organizations • Secretary's Commission on Achieving Necessary Skills (SCANS) • National Standards • Nationally Recognized Industry Standards and Certifications, such as A+, Net+, i-net+, Server+, etc. 	

Help Desk I

Course Description: Students will learn networking concepts, computer support services, industry recognized certification training, advanced web design, and career exploration while organizing a student-run Technology Help Desk.

Prerequisites: Computer Support Essentials

Recommended: 1 credit

Academic Expectations	Content/Process
<p>1.16,2.1,2.3,3.1,6.2 2.1,2.37,3.7,5.1,5.5,6.2,6.3 2.37,4.1,4.2</p> <p>1.16,2.2,2.37,3.3,5.1,5.3</p> <p>1.2,1.3,2.3,2.37 1.4,1.12,2.37,3.1,4.1- 4.3,5.1-5.5,6.2 6.3 1.12,1.4,4.1</p> <p>1.1,1.2,1.16,2.37,3.7 1.11,2.37,4.6 1.11,1.16,5.2,5.4 2.3,2.37,4.1,5.4 1.2,3.-3.5,4.1-4.3 1.12,3.3,4.1-4.3 2.36-2.38 3.7 2.3 2.1,2.3,3.4,3.7 5.1,5.4</p> <p>2.1,2.3 1.5-1.9,2.7 1.10 3.1,3.7,5.2 1.11,1.16,2.38 2.36,3.7</p>	<p>Students will demonstrate how to:</p> <ul style="list-style-type: none"> • Administer student domain of school network. • Diagnose and repair technological devices. • Communicate technical repair procedures to other students and superiors. • Analyze trends such as repeated problems with the same computer or user. • Install and configure new hardware and upgrades. • Operate Technology Help Desk. <ul style="list-style-type: none"> • Demonstrate appropriate telephone etiquette. • Access computer database and/or technological manual to present an informal response to help requests. • Develop and update a technical manual of common repairs. • Develop and update a website of site-licensed software and drivers. • Process warranty calls. • Train teachers and students to use technology. • Train technicians. • Demonstrate employability and social skills relative to the career cluster. • Prepare for industry recognized certification testing. • Set up, monitor and maintain a computer network. • Troubleshoot networking problems. • Examine proxy logs to monitor and ensure adherence to district Acceptable Use Policy. • Administer student email accounts. • Calculate subnet masks and IP ranges for networks. • Summarize and explain the different layers of the OSI Model. • Develop personal projects that solve a school or district problem. • Prepare a career portfolio. • Research developing technology and analyze the impact of this on their own careers and update transitional plan.
<p style="text-align: center;">Connections</p> <ul style="list-style-type: none"> • STLP and related Career & Technical Student Organizations • Secretary's Commission on Achieving Necessary Skills (SCANS) • National Standards • Nationally Recognized Industry Standards and Certifications, such as A+, Net+, i-net+, Server+, etc. 	

Multimedia Publishing

Course Description: This hands-on course applies publishing and presentation concepts through the development of sophisticated business documents and projects. These documents include, but are not limited to, brochures, manuscripts, reports, programs, catalogs, newsletters, flyers, business forms, and graphs, web pages, on-screen presentations, and video productions. Equipment such as scanners, digital cameras, video cameras, and color laser printers may be utilized in creating the documents. Formatting, editing, page layout, and design concepts are taught. Distribution ready publication standards are applied to all projects. Students will develop communication skills, problem solving techniques, cooperative learning, and interpersonal skills.

Prerequisites: Computer and Technology Applications

Recommended : 1 credit

Academic Expectations	Content/Process
<p>1.1,1.2,1.16</p> <p>2.9,2.10</p> <p>2.36,2.37,6.3</p> <p>1.13,5.4</p> <p>5.2,5.4</p> <p>1.13,2.9</p> <p>1.15,2.22</p> <p>1.16,2.9,5.2</p> <p>1.16,5.5</p> <p>1.13,2.10</p> <p>1.13,2.9,2.10</p> <p>2.36</p> <p>1.12,4.0,6.2</p> <p>1.9,1.10,1.12</p>	<p>Students will</p> <ul style="list-style-type: none"> • Apply language rules and proofreaders' marks; use reference materials; style, grammar, and spell check. • Define and apply terminology associated with desktop publishing, layout, and design. • Research and analyze career opportunities in multimedia publishing and graphic arts. • Use industry-standard hardware and software components of a multimedia publishing system such as digital cameras, scanners, & video cameras. • Apply basic HTML to create a simple web page. • Compose and design effective business publications and documents. • Develop multimedia presentations (slide show, video, audio, etc.) • Design page layout with appropriate proportions, balance, and typography. • Demonstrate the ability to use the Internet. • Use business graphics, paint, draw, and image-editing programs. • Design Career & Technical Education Student Organizations documents using effective multimedia publishing skills. • Demonstrate employability and social skills relative to the career cluster. • Utilize activities of a Career & Technical Education Student Organization as an integral component of course content and leadership development. • Apply math, science, and communication skills relative to the career major. • Design a web page using a software package.
<p style="text-align: center;">Connection</p> <ul style="list-style-type: none"> • STLP and related Career & Technical Education Student Organizations • Secretary's Commission on Achieving Necessary Skills (SCANS) • National Standards • Nationally Recognized Industry Standards and Certifications, such as A+, Net+, i-net+, Server+, etc. 	

Web Page Design

Course Description: Students analyze the structure of the worldwide web, apply basic principles of web documents and HTML, and develop multi-media web pages. Course content will include the understanding of hypertext and web structures. Equipment such as scanners, digital and video cameras, and sound recording devices will be utilized through hands-on instruction.

Prerequisites: Computer and Technology Applications or Multimedia Publishing

Recommended: 1 credit

Academic Expectations	Content/Process
<p>1.1,1.2,1.3,1.16 1.2,1.3,1.16</p> <p>1.2,1.3,2.14,2.33,2.37,3.6, 4.4</p> <p>1.2,1.3,1.10,1.11,1.16,2.22,2.37,5.2 1.1,1.2,1.3,1.10,1.11,1.16, 2.37,5.2,6.2,6.3</p> <p>1.10,1.11,1.13,1.14,1.15, 1.16,2.9,2.22,2.37,5.2,5.4</p> <p>1.2,1.3,5.1 1.3,1.10,1.16 1.1,1.2,1.3,1.10,1.16,2.37, 5.1 1.3,2.37,4.4 2.36,2.37</p> <p>1.2,1.3,3.2,3.5,5.4</p> <p>2.37,5.1 1.3,1.10,5.1,5.4</p>	<p>Students will</p> <ul style="list-style-type: none"> Analyze the history and current status of the Internet. Identify concepts and vocabulary associated with the Internet. Demonstrate an awareness of copyright, licensing, and downloading issues. Identify and apply design principles of web page structures. Create HTML documents including tags, files, links, tables, frames, forms, images, and text. Use a software package to create a multimedia web page with dynamic content such as the incorporation of sound files, digital photography, video files, and images into a web page. Identify browser restrictions. Analyze, create, and organize navigational links. Implement CGI and JavaScript programming. Demonstrate Internet etiquette. Explore and evaluate career opportunities in electronic publishing. Observe and practice safety precautions applicable to both classroom and home use of the Internet. Publish web pages to a web server. Formulate a user-friendly file structure for web publishing.
<p style="text-align: center;">Connections</p> <ul style="list-style-type: none"> STLP and related Career & Technical Student Organizations Secretary's Commission on Achieving Necessary Skills (SCANS) National Standards Nationally Recognized Industry Standards and Certifications, such as A+, Net+, i-net+, Server+, etc. 	

Networking

Course Description: Students learn to make sure the computer network hardware and software are operating properly in order to get the information needed. Using cable, fiber optics or wireless communications, they connect users to computer systems. Students learn area networks (WANs & LANs), and for connecting to larger networks and the Internet. They learn to identify, document and solve problems. Students learn to keep measurements on how the network is performing. They also learn to be responsible for adding users, making sure they have access to the files and network-connected equipment they need, while maintaining security and confidentiality of other files and data. Students also learn to install upgrades.	
Academic Expectations	Content/Process (based on standards from the Northwest Center for Emerging Technologies)
	Students will
	<u>Analysis Design</u>
1.1, 1.16, 5.1 1.2, 5.1, 5.5	<ul style="list-style-type: none"> gather data to identify customer requirements identify, interpret and evaluate systems and network requirements based on OSI model
1.2, 1.16 5.4	<ul style="list-style-type: none"> review network architecture, media (cabling), topology, interdependencies and constraints research technical alternatives and analyze technical options
5.1 2.3	<ul style="list-style-type: none"> participate in design reviews prepare overall design and integration plan for new processes, protocols and equipment
5.4, 5.5	<ul style="list-style-type: none"> recommend selection of architecture, topology, hardware and software
	<u>Configuration Implementation</u>
1.1, 5.4 5.2, 5.4 5.2, 5.4	<ul style="list-style-type: none"> plan and document system configuration including addressing implement new system configuration perform workstation configuration and software loading perform network device configuration & software loading
5.1 5.1, 5.5 5.1, 5.2	<ul style="list-style-type: none"> support, track and document change implementation assist in development of deployment plan and methods develop and implement security procedures
	<u>System Testing</u>
5.2, 5.4 5.1, 5.5 5.1	<ul style="list-style-type: none"> define and document test specifications develop test plan and procedures schedule and perform testing
6.2, 6.3	<ul style="list-style-type: none"> document, interpret and report test results
	<u>Monitoring & Management</u>
6.2, 6.3 5.2 5.1 6.3 5.2, 5.4	<ul style="list-style-type: none"> analyze system performance to baseline monitor and report component security and connectivity problems perform functional verifications and system audits make recommendations for system optimization/improvement generate and present reports
	<u>Administrative & Maintenance</u>
.16 5.1, 5.5 3.4, 5.1 5.1 3.3 5.1, 5.5	<ul style="list-style-type: none"> set up and maintain user accounts develop maintenance and upgrade plans schedule and coordinate network maintenance apply maintenance, upgrades and process changes coordinate, communicate and document changes

5.1 1.10, 1.11	<ul style="list-style-type: none"> • perform system backups and restore data • manage inventory • document maintenance activities
<p style="text-align: center;">Connections</p> <ul style="list-style-type: none"> • STLP and related Career and Technical Student Organizations • Secretary's Commission on Achieving Necessary Skills (SCANS) • National Standards from the Northwest Center for Emerging Technology • Nationally Recognized Industry Standards and Certifications, such as A+, Net+, i-net+, Server+, etc. 	

Programming

Course Description: Computer programmers design and create software. Students learn to analyze, design, develop, test and maintain computer and Internet-based applications. They will write specialized applications to satisfy a user's particular needs. They evaluate the project requirements, participate in design meetings, determine the best solution to a problem of feature and develop detailed design specifications. Students use development tools and programming languages in creating and testing the software.	
Academic Expectations	Content/Process (based on standards from the Northwest Center for Emerging Technologies)
	Students will
5.1, 5.2, 5.4	Perform Analysis
5.1	<ul style="list-style-type: none"> define system and software requirements establish measurable performance requirements
5.1, 5.5	<ul style="list-style-type: none"> develop test requirements
1.1, 1.16	<ul style="list-style-type: none"> gather data on development standards
5.1, 5.5	<ul style="list-style-type: none"> develop high-level systems and functional specifications
5.1, 5.5	<ul style="list-style-type: none"> determine security requirements
5.4	Develop Structure
2.3	<ul style="list-style-type: none"> choose an architecture identify major subsystems and interface
5.1, 5.2	<ul style="list-style-type: none"> assist with selecting design tools
5.1, 5.4	<ul style="list-style-type: none"> develop methods
5.1, 5.2, 5.4	<ul style="list-style-type: none"> validate design scheme and models
2.3, 5.1, 5.4	Design/Develop Program
2.3, 5.1	<ul style="list-style-type: none"> develop design and interface specifications identify system platform, components and dependencies
1.16, 5.1	<ul style="list-style-type: none"> develop appropriate data model
5.1, 5.2	<ul style="list-style-type: none"> prepare and conduct design review
5.1, 5.5	<ul style="list-style-type: none"> identify maintenance requirements
5.1, 5.4, 5.5	<ul style="list-style-type: none"> create and test prototypes
2.30	<ul style="list-style-type: none"> review and provide input to user documentation
5.1, 5.5	<ul style="list-style-type: none"> incorporate security requirements into design
1.11, 5.2	Implement Program
5.1	<ul style="list-style-type: none"> write code perform unit testing
2.3	<ul style="list-style-type: none"> integrate subsystems
4.1, 4.2	<ul style="list-style-type: none"> lead and/or participate in peer code review
5.1, 5.5	<ul style="list-style-type: none"> resolve defects and rework code
5.1, 5.5	<ul style="list-style-type: none"> revise and adapt existing code
5.1, 5.5	Test Program
5.1, 5.5	<ul style="list-style-type: none"> develop test plan and system
5.1	<ul style="list-style-type: none"> develop test procedures
5.1	<ul style="list-style-type: none"> perform test
6.2, 6.3	<ul style="list-style-type: none"> document test results and make recommendations
	Validate Program

2.30	• perform user acceptance test
2.30	• validate user documentation
5.5	• validate security features
Release Product	
5.1	• participate in development of release plan
4.1, 4.2	• train technical support staff
4.1, 4.2	• participate in development of user training plan
6.3	• transition to new system
5.5	• evaluate, correct and document defects
6.2, 6.3	• evaluate, implement and document enhancements
<p style="text-align: center;">Connections</p> <ul style="list-style-type: none"> • National Standards from the Northwest Center for Emerging Technology • STLP and related Career and Technical Student Organizations • Secretary's Commission on Achieving Necessary Skills (SCANS) • Nationally Recognized Industry Standards and Certifications, such as A+, Net+, i-net+, Server+, etc. 	

Computer Maintenance and Support Services

Course Description: Students learn to educate users as well as solve hardware or software operation and application problems. They learn to solve the problems users face in daily operation other skills include listening carefully and ask the appropriate questions to gather needed information and then take steps to solve the problem. Student learn to work help desk and walking users through the steps required to solve a problem over the telephone. They may also work with hardware and software installation and configuration.	
Academic Expectations	Content/Process (based on standards from the Northwest Center for Emerging Technologies)
6.2, 6.3 2.30, 4.1 2.30, 4.1 4.1, 4.2, 4.6 2.30, 4.1 2.30, 4.3, 4.6 2.30, 4.1 2.30, 1.4 5.1, 5.5 6.2, 6.3 5.1, 1.16 5.1 5.1 5.1,5.5 5.1 1.11 6.2, 6.3 6.1 5.1, 5.5 5.1, 5.5 4.1 5.5 5.1, 5.5	Students will Provide Facilitation and Customer Service <ul style="list-style-type: none"> gather and analyze customer input manage working relationships with customers perform negotiated services act as liaison between groups provide training to customers manage demands from multiple customers solicit customer feedback and apply input to improve quality of service document and communicate customer feedback and requests perform quality checks on outcomes of work performed document system installation configuration procedures and current configuration Perform System Operations, Monitoring and Maintenance <ul style="list-style-type: none"> operate Computer system and run system applications perform system diagnostics monitor and analyze system performance develop and implement preventative maintenance plan evaluate maintenance processes and outcomes communicate and document maintenance procedures and system status understand basic network concepts and terminology Perform Troubleshooting <ul style="list-style-type: none"> analyze problem and research solutions query existing knowledge base identify, test and implement solutions manage system resolutions with available resources communicate technical solutions and implementation process implement long-range solutions document hardware and software problems and resolutions
Connections <ul style="list-style-type: none"> STLP and related Career and Technical Student Organizations National Standards from the Northwest Center for Emerging Technologies Secretary's Commission on Achieving Necessary Skills (SCANS) Nationally Recognized Industry Standards and Certifications, such as A+, Net+, i-net+, Server+, etc. 	

Web Design

Course Description: Students learn to use web page development software to create or change web pages, inserting text content, graphics and interactive modules. They also learn to use research software tools to help design the look, feel and navigation of a web page. Web pages updates and work with the hardware associated with the web page is also emphasized.	
Academic Expectations	Content/Process (based on standards from the Northwest Center for Emerging Technologies)
	Students will
1.16, 5.1 2.30, 4.1 5.1 5.1 5.1, 5.4, 5.5 5.1 5.1, 5.2 5.1, 5.5 5.1, 5.2, 5.5 5.1, 5.5 5.1 5.1, 5.2, 5.5 1.16 5.2 1.16 5.2, 5.5 2.3, 5.1 5.1, 5.5 2.30, 5.1 5.1, 5.5 2.3, 5.5 2.3 5.1 2.30, 5.1 5.1 5.1, 5.3 1.11 5.1 1.16	Perform Content and Technical Analysis <ul style="list-style-type: none"> • evaluate web technologies and standards • provide quality customer service • review intellectual property right • define scope of work through contract • prepare and present functional and technical specifications • develop and present concept alternatives • prepare preliminary application • create and refine preliminary design/mockup • review technical considerations and constraints • design site security measures • develop project plan Develop Web Application Sites <ul style="list-style-type: none"> • develop site map and application models • select design tools and programming language • produce adapt graphics and layout elements • create or adapt content • write supporting code • develop supporting database • perform unit and integration testing Implement Applications/Site Design <ul style="list-style-type: none"> • develop and implement usability testing • plan and coordinate customer acceptance testing • plan rollout • facilitate move to production system • hand off to customer user Maintain Applications <ul style="list-style-type: none"> • update content • integrate customer feedback • perform application maintenance • recommend application/site improvements • document application/site changes Manage Web Environment <ul style="list-style-type: none"> • evaluate and recommend web hardware, software and third-party solutions • set up web server software and hardware

1.16	<ul style="list-style-type: none"> • manage web server
1.16, 5.1, 5.5	<ul style="list-style-type: none"> • support disaster recovery
5.1, 5.5	Maintain Internet Infrastructure <ul style="list-style-type: none"> • understand and be able to describe the core components of the Internet infrastructure
5.1, 5.2, 5.5	<ul style="list-style-type: none"> • identify problems with internet connectivity from source to destination for various types of servers including remote access
5.1, 5.4, 5.5	<ul style="list-style-type: none"> • identify when to use various diagnostic tools for resolving Internet problems
5.1, 5.4	<ul style="list-style-type: none"> • describe various hardware and software connection devices and when to use them
5.1	<ul style="list-style-type: none"> • understand and be able to describe how common networking topologies are used
5.1	<ul style="list-style-type: none"> • understand and be able to describe the capabilities of application server providers
Connections <ul style="list-style-type: none"> • National Standards from the Northwest Center for Emerging Technologies • STLP and related Career and Technical Students Organizations • Secretary's Commission on Achieving Necessary Skills (SCANS) • Nationally Recognized Industry Standards and Certifications, such as A+, Net+, i-net+, Server+, etc. 	